

What is Claimed is:

1. A method for processing a substrate, comprising:
depositing a barrier layer on a substrate; then
depositing a first conductive material on the barrier layer; and
depositing a second conductive material on the first conductive material by an electroless deposition process to fill discontinuities formed in the first conductive material.
2. The method of claim 1, wherein the barrier layer is deposited by a physical vapor deposition process or a chemical vapor deposition process.
3. The method of claim 1, wherein the first conductive material is deposited by a physical vapor deposition process or a chemical vapor deposition process.
4. The method of claim 1, further comprising depositing a third conductive material on the second conductive material by an electroplating process.
5. The method of claim 4, wherein the barrier layer is deposited by physical vapor deposition, the nucleation layer is deposited by physical vapor deposition and the second conductive material is deposited by an electroless deposition process.
6. The method of claim 1, further comprising rinsing the substrate after the electroless deposition.
7. The method of claim 1, further comprising annealing the substrate after electroplating the third conductive material.
8. The method of claim 5, wherein the nucleation layer comprises copper, the second conductive material comprises nickel deposited by an electroless deposition process, the substrate is rinsed after the electroless deposition process, the third

09900710-070601

conductive material comprises copper, and the substrate is annealed after electroplating the third conductive material.

9. The method of claim 1, wherein the first conductive material is selected from the group of copper, nickel, tungsten, and combinations thereof.

10. The method of claim 9, wherein the first conductive material further comprises a doping material selected from the group of phosphorus, boron, indium, tin, beryllium, and combinations thereof.

11. The method of claim 1, wherein the second conductive material is selected from the group of nickel, tin, and combinations thereof.

12. The method of claim 11, wherein the second conductive material further comprises a doping material selected from the group of phosphorus, boron, indium, tin, beryllium, and combinations thereof.

13. The method of claim 4, wherein the third conductive material is selected from the group of copper, doped copper, nickel, doped nickel, and combinations thereof.

14. The method of claim 4, wherein the nucleation layer comprises copper, the second conductive material comprises nickel, and the third conductive material comprises copper.

15. A method for processing a substrate, comprising:
depositing a barrier layer on the substrate;
depositing a seed layer of a first conductive material on the barrier layer by a physical vapor deposition process or a chemical vapor deposition process;
exposing the substrate to an electroless deposition process to deposit a second conductive material selected from the group of nickel, tin, and combinations thereof, on the seed layer to fill discontinuities formed in the seed layer; and
depositing a third conductive material on the second conductive material by an

09900710-070601

electroplating process.

16. The method of claim 15, further comprising rinsing the substrate after the electroless deposition.

17. The method of claim 15, further comprising annealing the substrate after electroplating the third conductive material.

18. The method of claim 15, wherein the barrier layer is deposited by a physical vapor deposition process or a chemical vapor deposition process.

19. The method of claim 15, wherein the barrier layer is deposited by physical vapor deposition, the seed layer comprises copper deposited by physical vapor deposition, the second conductive material comprises nickel deposited by an electroless deposition process, the substrate is rinsed after the electroless deposition process, and the substrate is annealed after the third conductive material is deposited by an electroplating process.

20. The method of claim 15, wherein the first conductive material comprises a conductive material selected from the group of copper, nickel, tungsten, and combinations thereof.

21. The method of claim 20, wherein the first conductive material further comprises a doping material selected from the group of phosphorus, boron, indium, tin, beryllium, and combinations thereof.

22. The method of claim 15, wherein the second conductive material further comprises a doping material selected from the group of phosphorus, boron, and combinations thereof.

23. The method of claim 15, wherein the third conductive material is selected from the group of copper, doped copper, nickel, doped nickel, and combinations thereof.

09900710-070601

24. The method of claim 15, wherein the seed layer comprises copper, the second conductive material comprises nickel, and the third conductive material comprises copper.
25. A method for patching electroplating seed layer, comprising:
depositing a barrier layer on the substrate;
depositing a copper seed layer on the barrier layer by a physical vapor deposition process, wherein the copper seed layer is discontinuous;
depositing a nickel patching layer on the copper seed layer by an electroless deposition process;
depositing a copper layer on the nickel patching layer by an electroplating process; and
annealing the substrate after electroplating the third conductive material.
26. The method of claim 25, further comprising rinsing the substrate after the electroless deposition.
27. The method of claim 25, wherein the copper seed layer further comprises a doping material selected from the group of phosphorus, boron, indium, tin, beryllium, and combinations thereof.
28. The method of claim 25, wherein the nickel patching layer further comprises a doping material selected from the group of phosphorus, boron, and combinations thereof.
29. A method for depositing a conductive layer in a feature on a substrate, comprising:
depositing a first conductive layer in a feature on the substrate;
depositing a second conductive layer in the feature by an electroless deposition process; and

T09020" 07200660

electroplating a third conductive layer in the feature to at least partially fill the feature.

30. The method of claim 29, wherein the first conductive layer is deposited by a physical vapor deposition process.

31. The method of claim 29, wherein the electroless deposition occurs in an electroless deposition process cell coupled to an electroplating platform.

32. The method of claim 29, further comprising rinsing the substrate after the electroless deposition.

33. The method of claim 29, further comprising depositing a quantity of electroless deposition fluid on the substrate and spinning the substrate to distribute the quantity at least partially across the surface of the substrate.

34. The method of claim 29, further comprising mixing components of the electroless deposition fluid in proximity to the substrate.

35. The method of claim 29, further comprising mixing components of the electroless deposition fluid in individual application quantities.

09900710 070601
T09040" 07200660